

**REMARKS**

Reconsideration of the September 10, 2003 Official Action is respectfully requested.

Claim 1 and all claims dependent thereon (Claims 2, 6-12, 14, 18, 22, 26, 30 and 34) have been canceled without prejudice or disclaimer of the subject matter thereof. Thus, Claims 3-5, 13, 15-17, 19-21, 23-25, 27-29, 31-33 and 35-42 are pending.

Applicants reaffirm the election of the invention covered by Claims 1-5 and 13. Although Claims 15-17, 19-21, 23-25, 27-29, 31-33 and 35-42 stand withdrawn from further consideration, rejoinder thereof is respectfully requested upon allowance of Claim 3.

Claims 1 and 2 were rejected under 35 U.S.C. §102(b) as allegedly being anticipated by U.S. Patent No. 5,017,270 ("Janicka"). The reasons for the rejection are set forth in paragraph 3, on pages 3-4 of the Official Action. However, in view of the cancellation of Claims 1 and 2, this rejection is moot.

Claims 3-5 and 13 stand rejected under 35 U.S.C. §102(b) as allegedly being anticipated by or, in the alternative, under 35 U.S.C. §103(a) as allegedly being obvious over Janicka. The reasons for the rejection are set forth in paragraph 6, on pages 4-6 of the Official Action. This rejection is respectfully traversed for the following reasons.

Claim 3 sets forth a coke oven including an array of combustion chambers separated from carbonization chambers by oven walls, each combustion chamber comprising a rich-gas port, and a pair of a lean-gas port and an air port, all of the ports are located on the bottom of the combustion chamber, characterized in that (1) the combustion chamber is defined into a first zone and a second zone by a center line extending in the direction of coke pushing, (2) said rich-gas port is located near the oven wall of the first zone, (3) the

midpoint connecting the centers of said lean-gas port and said air port is in the second zone, and (4) said lean-gas port and said air port do not completely overlap in any of the directions when viewed both in a direction of coke pushing and in a direction of oven battery of said combustion chamber. As explained below, Claim 3 and the claims dependent thereon are clearly patentable over Janicka.

In the Official Action, it is acknowledged that Janicka “fails to explicitly teach that the midpoint connecting the centers of said lean-gas port and said air port is in the second zone [and that said] lean-gas port and said air port do not completely overlap in any of the directions when viewed both in a direction of coke pushing and in a direction of oven battery of said combustion chamber” (Official Action at page 5). While acknowledging these deficiencies of Janicka, the Official Action takes the position that the claimed arrangement would have been obvious absent any showing of unexpected results. As explained below, unexpected results are demonstrated in the specification for the claimed arrangement.

Figure 13 shows the effects on NO<sub>x</sub> content and wall temperature of the combustion chamber depending on the amount of overlap between the lean-gas port and the air port. These results are explained on pages 31-34. As explained on page 32, the lean-gas port has a length of 250 mm and the air port has a length of 250 mm and in Figure 13, negative overlapped length means that there is no overlap between the ports whereas an overlap of 250 mm corresponds to complete overlap and values greater than 250 mm corresponds to complete overlap of the ports. From Figure 13a it can be seen that when the overlap lengths range from -100 to 200 mm the NO<sub>x</sub> content is low but drastically increases when the overlapped length exceeds 200 mm in the direction of oven battery (see specification at

page 32, lines 15-19). Figure 13b shows the wall temperature of the combustion chamber in the direction of oven height for an overlapped length of 250 mm (100% overlap), 0 mm (no overlap nor separation) and -100 mm (the separated length was 100 mm) (see sentence bridging pages 32-33 of specification). With complete overlap (overlap length 250 mm), the wall temperature of the combustion chamber in the lower region is too high which is a cause for the drastic increase in NO<sub>x</sub> content (see specification at page 33, lines 2-6).

When there is no overlap (overlap length of 0 mm) the wall temperature of the combustion chamber is more uniform over the oven height, as shown in Figure 13b. Figure 13c shows test results for singlestage combustion and while the NO<sub>x</sub> is somewhat higher than in multistage combustion, the effect from the overlapped length exhibits a similar tendency as shown in Figure 13a (specification at page 33, lines 19-25). Figure 13d shows data obtained when the waste gas was circulated within the system and it can be seen that the effect of the overlapped length is similar to that shown in Figure 13a (see specification at page 34, lines 1-8). Accordingly, it is submitted that the data set forth in Figure 13 shows unexpected results for the claimed arrangement wherein the lean-gas port and the air port do not completely overlap in any of the directions when viewed both in a direction of coke pushing and in a direction of oven battery.

Referring to Figures 1 and 2 of Janicka, it can be seen that air outlet 4 and poor gas outlet 6 are completely overlapped in the direction of coke pushing. Janicka does not recognize the effect obtainable in reduction of NO<sub>x</sub> by arranging the outlets 4, 6 in configurations such that they do not completely overlap in the coke pushing direction. Thus, there is no prior art suggestion to change the arrangement of the outlets 4, 6 shown in Figure 2 of Janicka to any other arrangement. As such, it is submitted that the Official

Action does not establish a *prima facie* case of obviousness with respect to the subject matter recited in Claim 3.

Claim 4 depends from Claim 3 and recites that when viewed both in the direction of coke pushing and in the direction of oven battery, the overlapped length of the air port and the lean-gas port in each direction is 80% or less of the complete overlapped length. As explained on page 32 of the specification, the NO<sub>x</sub> content drastically increases for overlap in excess of 80%. As such, it is submitted that the subject matter of Claim 4 is clearly patentable over Janicka.

Claim 5 depends from Claim 3 and recites that at least one of the air port and the lean-gas port is provided with an aperture adjusting member for adjusting the flow of lean gas and/or air. The Official Action takes the position that an aperture adjusting member is shown by Item 11a in Figure 1 of Janicka. However, Janicka discloses that 11a identifies regulating rollers for circulating stream openings 11 (column 3, lines 59-60 of Janicka). From Figure 2 of Janicka, it can be seen that Item 11a is located some distance from the outlets 4, 6. As such, it is submitted that the rollers 11a of Janicka cannot be considered aperture adjusting members for the outlets 4, 6 of Janicka. Thus, Claim 5 is clearly patentable over Janicka.

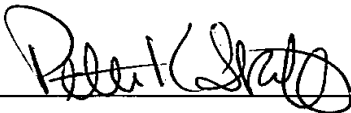
It is submitted that the differences between the claimed subject matter and the prior art are such that the claimed subject matter, as a whole, would not have been obvious at the time the invention was made to a person having ordinary skill in the art.

In view of the foregoing, it is submitted that the present application is in condition  
for allowance and such action is earnestly solicited.

Respectfully submitted,

BURNS, DOANE, SWECKER & MATHIS, L.L.P.

Date: December 10, 2003

By: \_\_\_\_\_

Registration No.

P.O. Box 1404  
Alexandria, Virginia 22313-1404  
(703) 836-6620

VA 42435.1